

What is claimed:

1. A high-speed envelope transport and packing system comprising:

a conveyor for conveying an open envelope having a flap,

a packing station for inserting an object into the conveyed open envelope; and

a bending member disposed in the packing station;

wherein the bending member is configured to impart a bend in the conveyed open envelope by displacing a center portion of the conveyed open envelope relative to widthwise distal end portions of the conveyed open envelope and to maintain a bend in a conveyed open envelope until the open envelope is gripped by a gripping device in such a manner as to provide access to an interior of the open envelope or until an object is at least partially inserted into an interior of the open envelope.

2. A high-speed envelope transport and packing system according to claim 1,

wherein the bending member is configured to bend the open envelope about an axis that is substantially perpendicular to a joint between the flap and the open envelope.

3. A high-speed envelope transport and packing system according to claim 2,

wherein the bending member comprises a rail disposed along a direction of conveyance of the open envelope in a position substantially corresponding to a center line of the conveyed open envelope with respect to a widthwise direction of the conveyed open envelope.

4. A high-speed envelope transport and packing system according to claim 3,

wherein the rail comprises a plurality of vacuum ports.

5. A high-speed envelope transport and packing system according to claim 4,

wherein the rail disposed along a direction of conveyance of the open envelope is disposed proximal to a side of the conveyed open envelope having the flap.

6. A high-speed envelope transport and packing system according to claim 5, wherein a front edge of the rail, relative to the direction of conveyance of the open envelope, is chamfered or curved.
7. A high-speed envelope transport and packing system according to claim 6, wherein the rail comprises a plurality of linearly arranged vacuum port manifolds, each vacuum port manifold comprising a plurality of vacuum ports.
8. A high-speed envelope transport and packing system according to claim 7, wherein front edges of the vacuum port manifolds, relative to the direction of conveyance of the open envelope, are chamfered or curved.
9. A high-speed envelope transport and packing system according to claim 3, wherein a height of the rail is less than about 5.0 mm.
10. A high-speed envelope transport and packing system according to claim 3, wherein a height of the rail is between about 1.25 mm and 1.75 mm.
11. A high-speed envelope transport and packing system according to claim 2, wherein the at least one bending member comprises paired rails disposed along a direction of conveyance of the open envelope in positions substantially equidistant to a center line of a conveyed open envelope with respect to a widthwise direction of the conveyed open envelope.
12. A high-speed envelope transport and packing system according to claim 11, wherein each of the paired rails comprises a plurality of vacuum ports.
13. A high-speed envelope transport and packing system according to claim 12, wherein the rail disposed along a direction of conveyance of the open envelope is disposed proximal to a side of the conveyed open envelope having the flap.

14. A high-speed envelope transport and packing system according to claim 13, wherein front edges of the rails, relative to the direction of conveyance of the open envelope, are chamfered or curved.
15. A high-speed envelope transport and packing system according to claim 11, wherein a height of the rails is less than about 5.0 mm.
16. A high-speed envelope transport and packing system according to claim 11, wherein a height of the rails is between about 1.25 mm and 1.75 mm.
17. A high-speed envelope transport and packing system according to claim 2, wherein the bending member comprises a channel disposed along a direction of conveyance of the open envelope in a position substantially corresponding to a central region of the conveyed open envelope with respect to a widthwise direction of the conveyed open envelope.
18. A high-speed envelope transport and packing system according to claim 17, wherein a width of the channel is greater than about half of a width of the conveyed open envelope with respect to the widthwise direction of the conveyed envelope.
19. A high-speed envelope transport and packing system according to claim 17, wherein a width of the channel is greater than about three-quarters of a width of the conveyed open envelope with respect to the widthwise direction of the conveyed open envelope.
20. A high-speed envelope transport and packing system according to claim 2, wherein the bending member comprises paired channels disposed along a direction of conveyance of the open envelope in positions substantially equidistant to a center line of a conveyed open envelope with respect to a widthwise direction of the conveyed open envelope, and

wherein the paired channels are disposed to receive widthwise ends of the conveyed open envelope.

21. In a high-speed envelope transport and packing system, the improvement comprising:

a bending member configured to bend a conveyed envelope about the z-axis during conveyance of the conveyed envelope to increase the moment of inertia of the conveyed envelope about the z-axis above a corresponding moment of inertia of the conveyed envelope in a flat state.

22. The improvement in a high-speed envelope transport and packing system according to claim 21,

wherein the bending member is configured to bend a conveyed envelope about an axis that is substantially perpendicular to a joint between the flap and the conveyed envelope.

23. The improvement in a high-speed envelope transport and packing system according to claim 22,

wherein the bending member comprises at least one of a center rail, a plurality of rails, a curved plate, a center channel, and a plurality of channels disposed along at least one side of a conveyed envelope, and

wherein the bending member is configured to displace a central portion of the conveyed envelope by less than about 5.0mm relative to widthwise ends of the conveyed envelope.

24. A high-speed envelope transport and packing system according to claim 1, further comprising:

a vacuum plate provided in the packing station;

wherein the vacuum plate is configured to bias an envelope and an envelope flap against the vacuum plate at least during insertion of an insert into the conveyed open envelope.

25. A high-speed envelope transport and packing system according to claim 24, wherein the vacuum plate comprises a plurality of vacuum ports extending widthwise across a portion of the packing station corresponding to a conveyed open envelope.

26. A high-speed envelope transport and packing system according to claim 24, wherein the vacuum plate is removably attached to the packing station.

27. A high-speed envelope transport and packing system according to claim 24, wherein the vacuum plate is provided within a central region of the packing station corresponding to a central portion of a conveyed open envelope.

28. A high-speed envelope transport and packing system according to claim 24, wherein the conveyor continuously conveys a plurality of open envelopes, wherein the vacuum plate is configured to bias each of the plurality of continuously conveyed open envelopes, as well as associated envelope flaps thereof, against the vacuum plate at least during insertion of an insert into the respective one of the continuously conveyed open envelopes.

29. A high-speed envelope transport and packing system comprising:
a conveyor for continuously conveying a plurality of open envelopes,
a packing station for inserting an object into a respective one of the plurality of continuously conveyed open envelopes; and
a means for controlling a flap of each of the continuously conveyed open envelopes during insertion of an object into each of the envelopes in the packing station.